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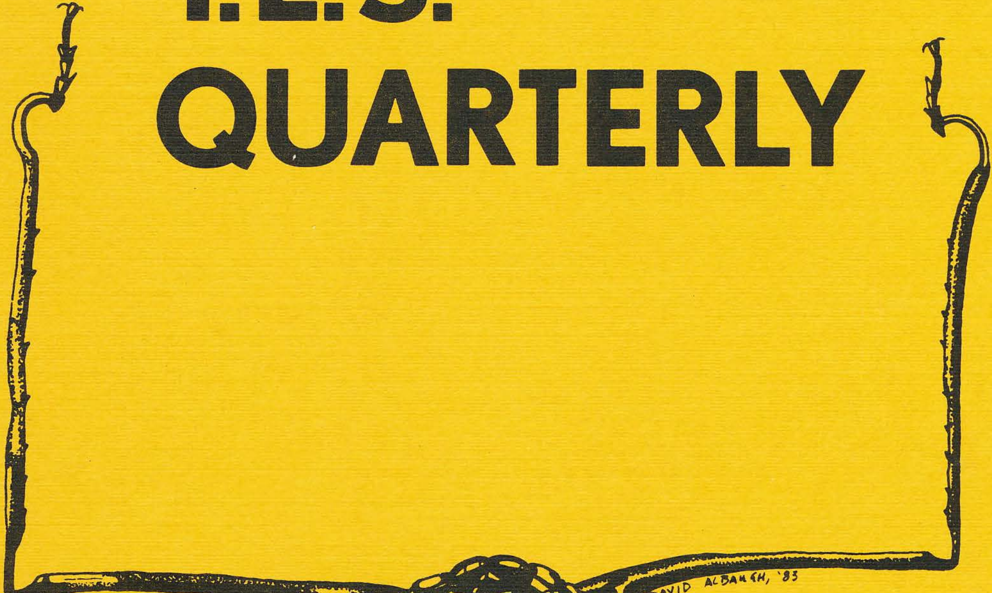
Y.E.S. QUARTERLY



Acrocinus longimanus
(Harlequin beetle)

*(formerly TIEG)

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Y.E.S. Quarterly
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Send to: Young Entomologist's Society, c/o Department of Entomology, Michigan State University, East Lansing, MI 48824-1115 USA.

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CONTENTS

1 Uncovering the Burying Beetle
Calvin G. Schultz

2 Treading
Gary A. Dunn

6 1982 Baja California Expedition
William H. Clark

8 Alcohol Preservation of Arthropods
W. F. Wilkey

9 Biking and Collecting
Kevin Woodward

11 Relaxing Dried Coleoptera
Cesare Iacovone

12 Collecting Butterflies in Montana
Craig Odegard

14 A Coleopterist's Chronicles
Gary A. Dunn

20 Locusts and their Control
S. Turner

24 Preparing for Tropical Insect Collecting
Donald Baumgartner

26 Nesting Habits of Polistes
Ann Patten

29 The Orange Grove
Suzanne Kekich

30 A Lepidopterist
Kevin MacKenzie

31 The Carabus of Italy
Cesare Iacovone

36 Basic Insect Collecting
Richard W. Merritt

UNCOVERING THE BURYING BEETLE

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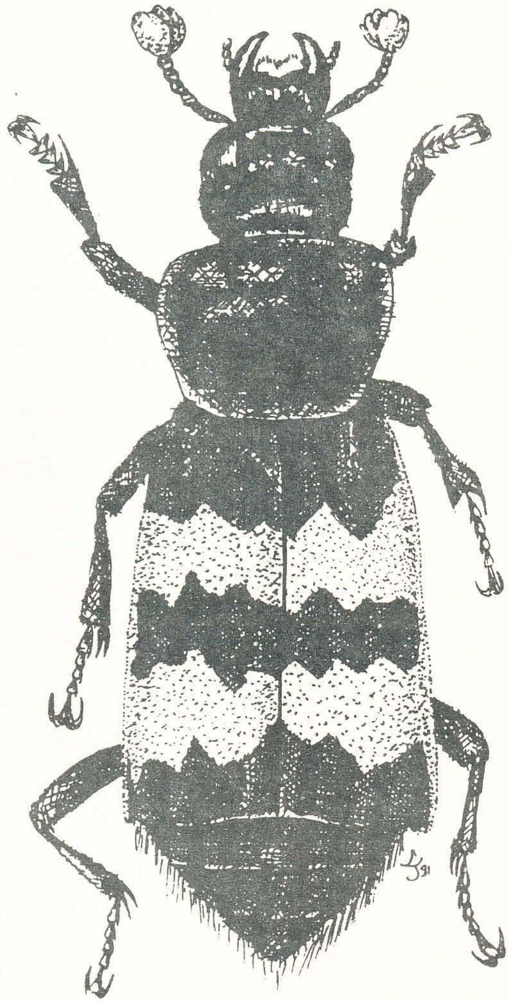


Nicrophorus marginatus

When I first started to collect insects, my methods were haphazard and collecting was often spotty. Whatever I caught in the net or plopped into the jar was later sorted out and then pinned up to become a part of the general collection. During this building time, I focused my attention on one kind of insect or another. Perhaps it was the colors, or even more likely it was the story of how it faithfully buried a little dead mouse or bird, that caused my interest about the burying beetle to grow. My desire to have some in my collection kept me searching for them on field trips. The deep, rich, orange, yellow, or red colored bands on the elytra (wing covers) were unique and attractive. I developed a growing interest in collecting a beetle with deliberate splashes of color on a black background, for beetles with such color markings are not commonly found. I read more and more about this group of beetles in an attempt to find the best way to collect them.

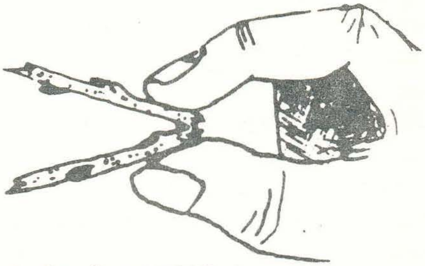
It was frequently pointed out that Nicrophorus was attracted to the odor of dead animals such as mice, moles, shrews, birds, frogs, salamanders, and reptiles. Whenever I went out to collect, I checked each dead animal to see if it might yield any specimens. As could be expected, often when the bird or other animal was turned over, I saw numerous maggots squirming for cover in the soft decaying tissue. On turning over an animal that had recently died, I commonly encountered small staphlinid beetles, mites, maggots, and beetles of the family Silphidae, but I rarely encountered Nicrophorus.

My series of Nicrophorus beetles simply was not growing. I began to doubt the truth of the stories about the famed burying beetle and how it would bury a dead animal. Days became weeks, weeks became months as I checked road kills for insects that might be attracted to them—especially Nicrophorus. Apparently, road kills were fair game for coyotes, crows, skunks, and flies, but not for the much-storied burying beetles, also known as carrion or sexton beetles. I kept finding little animals awaiting burial, but nowhere was the burying beetle. I secretly had visions of such beetles burying a little animal, but I did not see this during collection trips.

Two years passed before I found an excellent way to collect the much-touted orange and black grave digger of the beetle world.

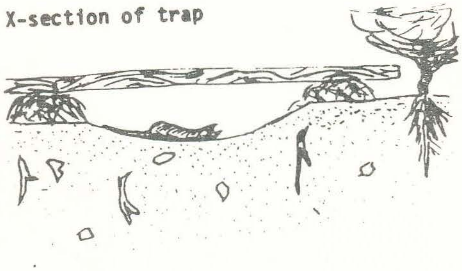
On one collecting trip, I parked my car on the side of the road in a grass field. I had noticed a snake that apparently had recently been killed by a car, and I went back to check it for specimens. I found a stick and with it carried the snake off the road into the grassy field. I thought that if I just let it lie on the ground, the fly maggots would soon be swarming. So I covered it up with an old board. I checked the snake the next day, with no success. The third day, still no beetles, but at least there weren't any maggots to contend with. Eager to find something, I went back on the fourth day and turned over the board. To my great surprise, there were two, large, burying beetles with bright orange-red banding on the elytra. As I raised the board, the beetles scurried for cover in the dead grass and under the snake. Mindful that the beetles had been crawling on a dead animal, I didn't want to touch them. I quickly made a pair of tweezers from a twig and collected both specimens.

It was a great day, for many past trips had yielded nothing but maggots. I wondered if perhaps this success could be repeated. I thought that if only the flies could be kept away from the snake, perhaps the beetles might have a chance to appear. Surrounding the snake with dried grass might hinder the flies from crawling through, once the board was in place. I reasoned that the dried grass barrier would be thick enough to keep adult flies from laying eggs on the snake, yet soft and natural enough to allow the strong burying beetles to reach the animal remains.



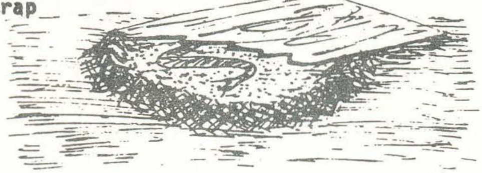
twig tweezers

X-section of trap



From experience, I found that I would get better results if the ground was loosened with a stick and a shallow depression was formed to hold the snake. The odors were free to escape, there was room for the beetles to work, and the ground would be soft enough for easy burial. I placed a loose barrier of dry grass around the shallow depression and placed a board on top of the ring of dry grass. With a lightweight board, one can place a small rock on it to keep the wind from blowing it off.

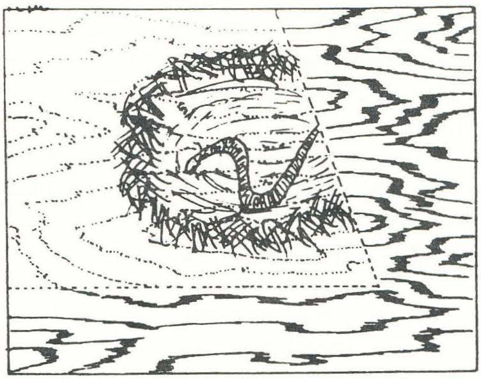
X-section of trap



After much experimentation, I found that snakes were a more powerful attracting force than other small, dead animals.

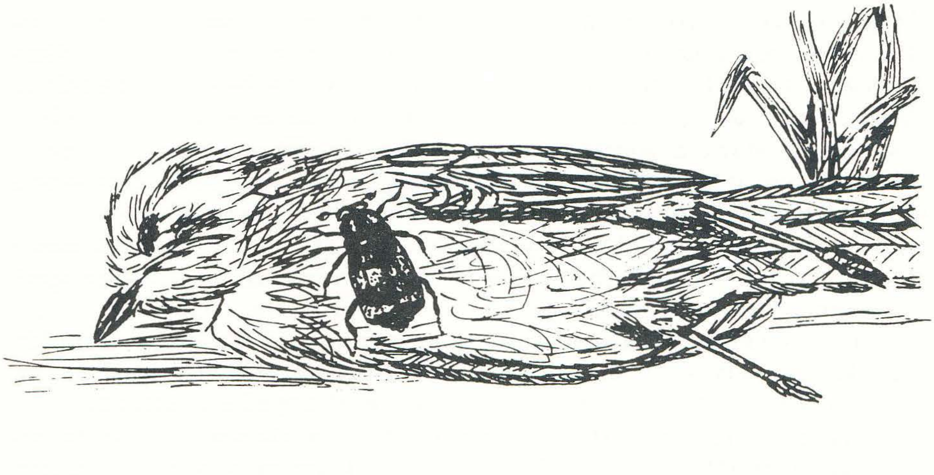
It seemed to be very significant to keep the flies away from the snake until the burying beetles arrived on the site. Some flies, such as blow flies, compete with carrion beetles for the same food source. The strong beetles fly to the source of the

Top "cut away view" of trap



carrion odor and then push their way through the dry grass barrier. The flies, on the other hand, seem to avoid dark places and places where they can't quickly fly into and out of.

During the summers that followed this initial trap testing, the collecting of burying beetles became both easy and quite route. I heartily recommend this successful form of trapping that allows easy collecting of both the burying and rove beetles. The trap set-up can be visited once or twice a day for up to ten days and usually its drawing powers reward the collector.



TREADING

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One key to successful insect collecting is searching in a variety of habitats. Habitats of shallow water with emergent vegetation can be sampled with a simple, though seldom used, technique called "treading." This technique can be used to collect arthropods (primarily beetles, bugs, and spiders) from habitats such as marshes, wet meadows, bogs, streams, ponds, and lakeshores.

Treading requires but a few pieces of basic equipment: a pair of rubber waders (boots or old sneakers will do) and your collecting bottles. (NOTE: It is not a good idea to tread with your bare feet!) Forceps, a small dip net (for aquaria), and a plastic pail are useful for capturing and handling specimens. I also recommend that you be prepared with a wide-brimmed hat, polarized sunglasses, sunscreen, and mosquito repellent.

Treading is quite simple and quickly mastered. First, select the general area or habitat type you wish to collect in. When you arrive at the chosen site, put on your waders and randomly select a wet area in which to begin treading. Start in an area where there is some type of emergent vegetation and where the water is between six inches and two feet deep. Begin thoroughly treading (stomping) a small area of vegetation into the water with your feet. Continue this process for several minutes, then step back and watch the treaded area. Arthropods soon will begin to come to the surface of the water. Some only pop to the surface momentarily, so be ready with your dip net. This activity should continue for several minutes before subsiding. The murky water will make it difficult to see some insects, especially dark-colored beetles. This is where the pail (or a large sieve) comes in handy. Dipping water out of the treaded area will enable you to collect the hard to see specimens.

After you are relatively certain all of the specimens have been collected from the treaded area, move on to another spot and repeat the process.

Your results with this collecting technique will vary according to the type of habitat and vegetation, water depth, and season, so be sure to try treading in a variety of situations.

My experience with this technique has shown that it is an excellent method for collecting a variety of spiders, aquatic mites, ground beetles, rove beetles, weevils, leaf beetles, water scavenger beetles, predaceous diving beetles, whirlygig beetles, plant bugs, giant water bugs, waterscorpions, waterboatmen, water measurers, and dragonfly, damselfly, and mayfly immatures.

While you are out treading, you may want to try the following: (1) throw water up on the shore to force soil-dwelling insects out of their burrows and (2) rake shoreline debris such as leaf litter, sticks and rotten wood into the water to "float out" small insects.

1982 BAJA CALIFORNIA EXPEDITION

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August 7, 1982, culminated over a year of preparation as seven Idaho Entomology Group (IEG) members (Paul and Ann Blom, Dave and Val Ward, Mike Twitchell, Mark Huago, and myself) and two others (Jane Luther and a C of I student) departed from the Museum of Natural History, College of Idaho for Baja California, Mexico.

We camped the first night at the Winnemucca Dunes, Nevada, serviced our pitfall traps and collected a nice carabid, Geopinus incrassatus. We traveled on to Berkeley, California, and spent the morning of the 9th visiting the California Academy of Sciences Entomology Collection. There we met Dr. Wojciech J. Pulawski (Hymenoptera) and Sue Condi (one of the original members of IEG). From CAS we moved on to Baja, California, spending the night of the 10th at our Ejido Uruapan site and collecting adults of a new species of Stenopelmatus. The adults had eluded us for several years, but the pitfall traps finally paid off. We added another specimen from a pitfall at a new locality farther south the following day.

After a night of orientation and preparation at Rancho Santa Ines (Catavina), we headed for our first major study site: Valle Montevideo. Here we found the collecting excellent and began filling our Lepidoptera spreading blocks with moths (Thanks to David Faulkner and John Brown for sharing this technique with us!). We were excited to find our rain gauges (established the preceding summer) intact and working: 0.85 inches of precipitation since January, 1982!

The following day found us at Bahia de Los Angeles and in extreme heat. Here we met Dr. Daniel Anderson, ornithologist, from the University of California--Davis. He and a colleague were studying daily migration of several bird species. From there we headed south on a road new to us--trying to intersect the road that runs east of El Arco. This road is about sixty miles long and is not described in Baja travel books. Workmen on the road (it was being upgraded) said that no cars had traveled on it for a month. At a fork in the road, we took the wrong one and ended up near Bahia San Rafel. Saw some beautiful desert country--but lost a day!

Insect collecting was extremely poor due to the dry conditions. Evidence of cattle eating the cardon cacti was abundant. Even the cholla cacti appeared under severe water stress.

The next day we made thirty miles on a very rough road. A few tire repairs later found us at the base of a hill which slowed us considerably. Along the road, we collected the large cicada, Diceroprocta digueti, but they were extremely wary.

After spending a night in a building up the hill, we arrived at El Progresso, where it had not rained for three years! From El Progresso we headed toward our other established study sites.

We traveled over the granite mountains and the pass known as "The Gate" for the first time and spent the night of the 15th at our Rancho Mina site. We were up most of the night as the collecting was fabulous. We picked up thousands of insects and some nice vertebrate material. Plant measurements, pitfall traps, meterological data and other routine information was gathered as for all our study sites.

Next we blitzed two additional sites between Mina and El Arco. Paul collected Moneilema at various overnight stops to add to our knowledge of that Cerambycid.

From El Arco we headed to Guerrero Negro for showers and basic supplies. Water was scarce, but most of us got showers. We then headed south to the El Tablon site for more research.

The evening of the 19th, we arrived at our El Crucero study site for a two-day visit. Many Yucca valida individuals had to be examined. We then returned to Rancho Santa Ines for a much deserved R&R (tacos, cerveza, and banos). We set up camp at our nearby main study site and began our research projects. We actually weathered two rainstorms producing a total of 0.05"!

We collected a good series of adult Ateloplus (big gray suckers), a new species of Orthoptera, but struck out searching for more specimens of a new Petropedes. Dr. Earnest Tinkham is describing the Orthoptera.

Our big project involved the total dissection of a 10m-tall cardo cactus. In addition to biomass, anatomy, and root characteristics, we found some interesting arthropods in a woodpecker nest and several specimens of a species of Phobetus (scarab beetle) around the roots. The above-ground portion of the cardon weighed over 1300 kg.

We departed Santa Ines early the 4th of September, drove to Ensendada for shopping, and there fought the crowds attracted by the recent devaluation of the peso. We crossed the border at Mexicali and spent the night in Indio visiting the IEG member Dr. Tinkham and his wife. The next day we visited sites in the Mohave desert before our final leg back to Caldwell.

ALCOHOL PRESERVATION OF ARTHROPODS

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Frequently larvae or other soft-bodied arthropods will turn or decompose when collected and preserved in alcohol. Several special collecting fluids will prevent this, but these are not necessary. Heat is the answer.

If convenient, drop live specimens into boiling water. Immediately (remove from the heat source. When cool, transfer the specimens to 70-75% alcohol. If the specimens are collected in the field and placed directly into alcohol, this can be heated—within 24 hours. It is best to transfer these specimens to fresh alcohol when cool. When heating, just bring the alcohol to a boil.

Heating tends to "quick fix" the body tissue. In addition to providing a perfect specimen indefinitely, if the specimen is to be slide mounted at any time in the future, it can be "cleared" with ease. This is not usually the case with "cold fixed" material.

BIKING AND COLLECTING

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Hayward is a small town in northwest Wisconsin. The major industries are logging and tourism. The surrounding area consists mostly of mixed deciduous and coniferous woods with many fresh-water lakes. Though the summers are pleasant, the winters are fierce and only the hardiest insects can survive. Unfortunately the hardiest and most common insect is the mosquito. It is also the most "collected" insect in the area, with thousands being smashed between clapped hands or fried by electronic bug zappers every year.

Since moving to Hayward six years ago, I have been steadily losing interest in collecting in this area. After the initial excitement of my first summer of serious collecting, the local supply of species seemed very limited. Since I had little patience for spreading any Lepidoptera under two inches in wingspan, my collecting possibilities were even more limited. My butterfly catches that first year (1977) consisted of Nymphalis vaualbum, N. milberti, Liminitis a. arthemis, and Papilio glaucus canadensis (which is the most common butterfly throughout May and June). At night I turned my attention to moths, which were much more diverse. I expanded my collection of sphingids by ten species, including Pachysphinx modesta (which is very common in this part of Wisconsin) and three species of the genus Hyloicus. Saturniids didn't seem too common then (I only caught one polyphemus) but their numbers have improved in recent years. The most common saturniids proved to be the polyphemus and luna moths, but I did make a couple of prize catches this year--a female promethea and a male Io moth. Though common in other parts of the United States, they are far from common up here.

This seemed to be a good year for prometheas. It was good because I had never seen any around before. I saw a couple of males flying in the afternoon, as is their habit, but I was never near a net when I saw them. I was surprised at how fast they fly, faster than any other large silkmoths I have seen.

You might be wondering how I catch all these moths. Since we live eight miles from town, we are well out of the range of the city lights, so that when it gets dark--it gets DARK! So if you don't want to feel like you're living in a cave, it's nice to have a yard light. The one that we have is equivalent to a city street light and attracts all kinds of night-flying insects.

My most exciting catch beneath that light was, oddly enough, made with my hands. It was a cool night in late May when I went out halfheartedly to check what was flying around. I didn't expect to see too much, but when I got out there I heard the flapping of wings on the gravel driveway. I saw the moth, which appeared to be a small cecropia, and pounced on it with my hands. I was not worried about injuring it since I had quite a few cecropias in my collection already. But when I examined it more closely it proved to be a female Columbia silkmoth. Even after rough handling, the moth was still in perfect condition. I was so excited that I killed it immediately without thinking of the rearing possibilities.

Lately my interest in collecting and bike riding has greatly increased, and I have had to turn to butterflies that didn't interest me before. For example, I had never collected satyrs or wood nymphs. Their drab color and fragile wings made them less than desirable. But this year I decided to investigate the species in my area. I have found them to be interesting and beautiful in their own way. Particularly interesting is *Lethe portlandia anthedon.* It is a fast, erratic flyer that frequents dirt roads, but when disturbed it makes a mad dash for the woods where it alights and turns to face the pursuer. Needless to say, it is a difficult insect to catch. Also, I found specimens of *L. eurydice*, *Cercyonis pegla ino*, *Euptychia c. cymela* and *Coenonympha i. inornata.*

Another group of butterflies I have become interested in are the Lycaenidae. Though not numerous, I have found them to be among the most colorful butterflies in the area, especially the members of the genus *Lycaena.* The American copper, *Lycaena phlaeas americana*, is common, and I recently caught a female *Lycaena xanthoides dione.* When I first saw it on a flower beside the road, I thought it was some kind of wood nymph because of its size. It is the largest copper in the Nearctic region.

My ten-speed bicycle has been very helpful to my collecting. It is surprising what a difference a couple of miles can make. Leaving the wooded area around my house and biking to a nearby field gives me the opportunity to find butterflies that inhabit more open areas. Using a bicycle for collecting also makes my local trips more enjoyable since bike riding and bugs are two of my favorite pasttimes. The only equipment I carry with me is my net, which I strap to my bike with an elastic cord, and a small plastic box to put the captured specimens in. I carry no killing equipment. Not only is there a lack of room, but I also find it unnecessary. A firm pinch at the thorax of most butterflies is enough to kill them. Another small plastic container could be taken for live insects, if desired.

If anyone would like more information on these collecting techniques or the Lepidoptera of northwestern Wisconsin, I am willing to correspond.

Collecting in your home area is very educational and rewarding. Not only do you learn about the local insects, but you learn about your local environment as well.

RELAXING DRIED COLEOPTERA

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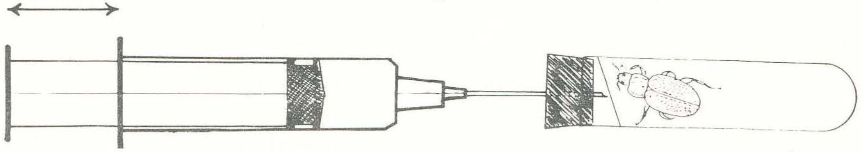
It is often necessary to examine male genitalia and other structures if one wishes to determine dried, mounted specimens. But the examination of these anatomical structures is often hindered by appendages. Sometimes the male genitalia must be dissected, and to do this, the specimen must be relaxed.

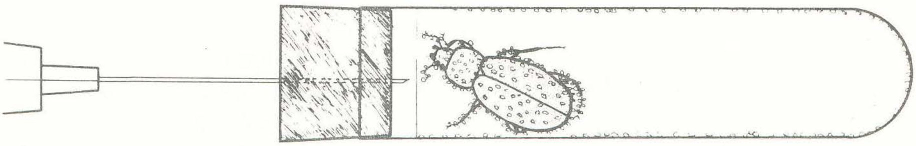
As you know, there are several methods for relaxing insects, but these are often time-consuming or require chemical products and, especially for young entomologists, these methods are not as easy as they seem. The simplest way to relax specimens is to let them absorb water for a little while. To do this there is a very simple and fast way. The process only requires a few materials: a syringe, a test-tube (small bottle), and a cap for the bottle. Proceed as follows:

1. Fill the test-tube with water, but not totally.
2. Place the insect that you want to relax in the test-tube with water.
3. Put the cap on the test-tube (the space between the level of water and the cap must be small).



Test-tube with syringe (the level of water must be approximately 5mm from cap).

4. Put the syringe inside the cap until it reaches the other side of it.
5. Move the plunger of the syringe up and down to let the air out. The first thing we see during this operation is bubbles on the insect (this means that the insect is absorbing water in the muscular tissues). After doing this several times, the insect will have air bubbles all around the body.



6. Remove the cap and the insect will fall to the bottom of the test tube.

If everything has been done correctly, the insect will be relaxed.

COLLECTING BUTTERFLIES IN MONTANA

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Western Montana is an excellent place for anyone interested in butterflies and moths to begin collecting. There are several different types of habitat, ranging from low-lying river valleys to huge mountains over 10,000 feet tall. In the area around my house, there are three different types of habitat; meadows and fields, high mountains, and valley with creeks running through them.

I began collecting Lepidoptera a few years ago at the age of ten. I would go out in the yard with a fishing net and catch mourningcloaks (Nymphalis antiopa), but I never kept any of them. In mid-June 1980, I caught a perfect specimen of a two-tailed swallowtail (Pterourus multicaudatus) and since it was so beautiful, I decided I would try to mount it. With a little help from my dad, I made a spreading board out of cardboard and mounted the butterfly. Later that day, I caught a colon checkerspot (Occidryas colon) and that is when my serious Lepidoptera collecting began.

During summer vacation, I spend most of my spare time collecting butterflies and moths. I catch most of my specimens by the creek. In the springtime, there is a pond by part of the creek, but during the summer, it soaks into the ground. However, after the water soaks up, there is a lot of mud and the butterflies congregate on it to sip up the moisture. While they are drinking, they don't pay much attention to what else is going on and I can capture many perfect specimens in one trip up the creek.

Another way I obtain perfect specimens is by rearing caterpillars. It is truly amazing, watching them change from a caterpillar to an adult in such a short time.

An amusing incident happened one day when our family was in Glacier National Park. We decided to go hiking to a lake in the park and it turned out to be a beautiful day, so I took along my butterfly net and some jars. We hiked up to the lake, and on the way back, nearly every person we met on the trail asked if we caught any fish. Then we had to explain that the net was for butterfly collecting, not fishing.

Probably the most surprising trip I ever had was when my dad and I hiked up Lolo Peak. It was a sunny, warm day and the temperature was over 90°F in the valley, so we decided to hike to the top. I brought along my butterfly net, a killing jar, and a cotton-filled box to put the dead specimens into. Since Lolo Peak is over 9000 feet high, I was hoping to catch some parnassians, which are found at high altitudes. But, instead of parnassians, I caught two butterflies which I had never seen before. When I got home, I discovered they were Chryxus Arctics (Oeneis chryxus). This is an example of why I like Lepidoptera collecting. You never know what you might find!

Now my collection has grown to over 200 specimens and nearly 80 species, including some tropical species I have obtained through catalogs. I am hoping you (the Y.E.S. members) will send a list of any Lepidoptera you would like to trade or sell so my collection and yours will gain many new species. If you would like a list of the Lepidoptera I have for sale or exchange, or if you have any to sell or trade, please write to: Craig Odegard, 7385 Beryl Lane, Missoula, MT 59801 USA.

A COLEOPTERIST'S CHRONICLES

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The hazards experienced by many early 19th century American beetle collectors included working in remote, poorly mapped areas, slow and inefficient means of transportation, difficulties in obtaining supplies, difficulties in field preservation of specimens and even hostile Indians.

The modern-day beetle collector is not faced with as many perils as the collectors of yesteryear, but there are still many surprises that catch even the most prepared collector off-

guard. Just about every collector I know has anecdotes about unexpected bad weather, unproductive collecting, and encounters with angry landowners or curious non-entomologists (after all, there is something about nets and blacklights that promote curiosity among the uninformed).

Over the past five years, I have generated my own share of "tall tales" in the process of hunting for beetles. When I think back on all of the experiences I have had while collecting, even the disasters make me smile (maybe even chuckle out loud), and I guess I chalk these up to experience. But more importantly, I feel good inside when I think about the many great experiences I have had along the way--like those unbelievably productive sites, the companionship of collecting with friends, the outstanding scenery, and of course, those rare finds. These are some of the things that make it all worth while.

Here, in chronical form, are some of the more memorable experiences I have had along the way as I collected ground beetles (Coleoptera: Carabidae) and tiger beetles (Coleoptera: Carabidae: Cicindelinae):

August 7, 1979 - Plainfield, Sullivan Co., New Hampshire - Strip down to trousers and swim across Connecticut River to search cobblestone island for the rare tiger beetle Cicindela marginipennis; while collecting beetles, a strong gust of wind blows clothing into river and they float away.

August 9, 1979 - Merrimack River near Canterbury, Belknap Co., New Hampshire - Collecting with friend; lock keys in car while parked in a remote area; search of area produces piece of wire which is used to get into car.

April 14, 1979 - Red River Gorge, Monford Co., Kentucky - Using topographic map to find road into gorge. Map indicates the presence of a tunnel, which when finally found turns out to be a real surprise--it is nothing more than a hole in the mountainside 40 yards long and barely wide enough for the car to get through.

April 15, 1979 - Appalachian Mountains, Harlan Co., Kentucky - Lost and trying to locate Kingdom Come State Park. While driving up mountain road encounter a sign which reads "Break in Pavement"; expect to find perpendicular construction trench in road, instead it means part of the road has fallen into the valley below!

August 11, 1979 - West Lincoln, Lancaster Co., Nebraska - Questioned by Nebraska State Highway Patrolman about my collecting activity along the shoulder of I-80. After giving an explanation and assurances that this would not be a routine event at this site, he allowed me to stay.

August 12, 1979 - Middle Loup River near Cairo, Howard Co., Nebraska - Stop at Middle Loup River to collect on sandbars; spend entire afternoon and evening collecting; decide to run blacklight on sandbar that night; collecting is good and finally quit at 1:00 AM; set up camp among brush along river.

August 13, 1979 - Custer Co., Nebraska - Collecting beetles in sand "blowouts" along Route Two in the sandhills region and accidentally discover planting of marijuana growing among the range weeds; decide it is wisest to leave area immediately.

August 15, 1979 - Angostrura Dam, Fall River Co., South Dakota - Weather is cool (60°F), windy and rainy; anticipate searching for large, flightless tiger beetles (Amblychila cylindriformis) would be fruitless, but decide to set barrier-pitfall traps just in case. Next morning: two beetles taken in traps and a third specimen captured as it is seen descending into a gopher hole.

August 16, 1979 - Republican River near Benkelman, Dundy Co., Nebraska - Fall into thigh-deep quicksand while collecting along the banks of the Republican River.

August 16, 1979 - Republican River near Parks, Dundy Co., Nebraska - Use railroad bridge as access to sandbar in Republican River; less than two minutes later a train crosses over the same bidge.

March 28, 1980 - northern and eastern Texas - Plan to collect in Kansas and Oklahoma but it snows (10"); travel south to Dallas, Texas, to find adequate temperatures and sunshine. Spend part of one day collecting before torrential rains start. Wait a day and a half for rain to stop, without luck; must drive straight through from Nacogdoches, TX, to East Lansing, MI, (1150 miles in 24 hours).

May 3, 1980 - Cherokee, Alfalfa Co., Oklahoma - Search alkali flats for endemic tiger beetles (Cicindela willistoni hirtifrons) but with no results. Sun is strong; air temperature in excess of 90°F, and by end of day have severe sunburn.

June 9, 1980 - Everglades, Monroe Co., Florida - Mosquitoes so thick it looks like snow in the headlight beams; there is an audible hum in the air. After several hours of enduring the swarms of mosquitoes, the effort finally pays off and several specimens of a rare, endemic tiger beetle are taken at lights.

June 13, 1980 - Whitney Beach, Manatee Co., Florida - Finally locate a relatively undisturbed beach that supports a population of the white, coastal tiger beetle Cicindela dorsalis saulcyi, but soon find out the beach is also used by the local female residents for topless sunbathing.

July 26, 1980 - near Interstate-65, Marshall Co., Tennessee - Have difficulty locating campground after sunset; finally locate the park and manage to set up camp before tremendous thunderstorm hits. Park ranger never appears to collect camp fee.

July 27, 1980 - Monte Sano State Park, Huntsville, Madison Co., Alabama - Patrol miles of trails and footpaths along Monte Sano ridge searching for the rare tiger beetle Cicindela unipunctata; only succeed in collecting four specimens between two collectors.

July 28, 1980 - Buzzard's Roost, Hoosier National Forest, Perry Co., Indiana - Set up camp in deserted National Forest campground; weather is cool and rainy, but deployment of barrier-pitfall traps nets a specimen of the crevice-dwelling carabid Agonum (Rhadine caudata).

August 31, 1980 - Grand Saline, Van Zandt Co., Texas - Obtain permission to set up UV/blacklight on alkali flats of Morton Salt Company; local residents report UFO (Unidentified Flying Object) to authorities.

September 3, 1980 - Red River near Burkeburnett, Wichita Co., Texas - Find LCD wristwatch (Texas Instruments brand) embedded in salt-encrusted sand of Red River sandbar; it showed correct day and date and still operates to this day.

July 4, 1981 - Alabaster Caverns State Park, Woodward Co., Oklahoma - Pack up tent in morning and find a specimen of the green, flightless tiger beetle Megacephala virginica under the ground cloth.

July 10, 1981 - Rose Lake Wildlife Research Area, Clinton Co., Michigan - Unknowingly set barrier-pitfall traps among poison sumac in peat bog; contract poison sumac on right arm.

July 15, 1981 - Everglades, Monroe Co., Florida - Watch alligators with one eye and beetles with the other eye while headlighting at night (alligator eyes glow bright orange in a flashlight beam). Despite dry season, mosquitoes are as bad as 1980; however, collecting is very poor.

July 16, 1981 - Crawl Key, Monroe Co., Florida - Asked to leave coral reef habitat of the rare tiger beetle *Cicindela olivacea* by an angry dive-shop owner who thinks I am there to net tropical fish; my collecting permit and explanation assure him I mean no harm; I am allowed to finish collecting.

July 16, 1981 - Carlos Pass, Lee Co., Florida - Return to area where the white, coastal tiger beetle *Cicindela dorsalis saulcyi* was taken in 1980, but find condominiums are being built on the habitat.

September 4, 1981 - Tucumcari, Quay Co., New Mexico - Arrive at known locality of large, flightless tiger beetle *Amblychila cylindriformis*; search of area with headlamp and lantern produces no specimens (only an elytral fragment); however, no rattlesnakes were found either.

September 8/9, 1981 - Willcox Playa, Cochise Co., Arizona - Arrive at Willcox Playa, *the* best tiger beetle habitat in North America, but weather is windy, cool, and threatening to rain (and does for the next two days); collecting is very poor.

September 10, 1981 - Bottomless Lakes State Park, Chaves Co., New Mexico - Collecting at lights (lantern, UV-blacklight and street lights) is fantastic; finally quit at 2:00 AM. Almost get car stuck on slick clay of edge of alkali flats.

September 11, 1981 - Food from *real* Mexican restaurant eaten the night before causes severe intestinal distress.

November 15, 1981 - Salt Fork Lodge, Guernsey Co., Ohio - Weather is favorable and beetle habitat looks good, but I have no collecting equipment. Ice buckets from hotel are used as pitfall traps, and I end up with a respectable catch.

April 21, 1982 - Chattahootchee National Forest, Gordon Co., Georgia - Get lost trying to find campground after dark. Once located, I find out it is closed; however, the gate is unlocked and I enjoy the campground to myself. Tremendous thunderstorm after midnight.

April 24, 1982 - Santa Fe River at Gilchrist/Suwanee Co. Line, Florida - Local thieves break into car while friend and I collect on other side of river. Total loss and damage comes to $500.00.

May 3, 1982 - Lookingglass River, Clinton Co., Michigan - Take first-ever specimen of the carabid beetle *Blethisa* while headlighting; beetle is taken on the sandy road of a boat ramp parking area. Subsequent searches and pitfall trapping of the area fail to produce any additional specimens. (However, within a month, three additional specimens are taken while collecting in the Upper Peninsula of Michigan; that's the way it is with rare beetles--after you find the first one you are bound to find others in short order!

July 22, 1982 - St. Clair, Franklin Co., Missouri - Automotive transmission failure on Interstate-44 at 11:00 PM at night. Spend all of next day in St. Clair, MO, until the necessary repairs can be made; total bill comes to $600.00.

July 23, 1982 - Amarillo, Potter Co., Texas - Gas station attendant tries to sell me new tires claiming the current set are ready to fail at any moment. However, the same tactic was used in 1981 while passing through the Amarillo area, so the warning was ignored (without any future consequences).

July 23, 1982 - Tucumcari, Quay Co., New Mexico - Second visit to known Amblychila habitat; even with two collectors searching, no specimens are seen. However, four specimens of the white tiger beetle Cicindela lepida unexpectedly come to the lantern.

July 28, 1982 - Willcox Playa, Cochise Co., Arizona - This is a great way to celebrate a birthday--at the premiere tiger beetle habitat in North America. Collecting is reasonably productive (despite the fact that it is very dry). Locate a new population of the tiny tiger beetle Cicindela viridisticta along a newly-graded roadside drainage ditch. Capture representatives of 85% of the Sulpher Springs Valley tiger beetle fauna.

Lighting later that night: Plenty of activity at the blacklight. A single specimen of the tiny, flightless ground beetle Pogonistes (restricted to salt flats) appears at the light; however, in trying to pick up the specimen it gets pushed into the gravel with the fingertips and vanishes, not to be seen again. A short time later some local residents come to investigate the eerie blue light on the saltflats.

July 29, 1982 - Chiricahua Mountains, Cochise Co., Arizona - Manage to drive car over the mountains on gravel logging trail. Heavy rains in the mountains cause streams to flood making roads to north and west impassible (there is no road to the south); alternate route to the east results in an 80 mile detour.

July 29, 1982 - Cochise Stronghold, Dragoon Mountains, Cochise Co., Arizona - Set up camp in Cochise's Stronghold Canyon. Search along bases of hugh boulders and capture four specimens of the large, flightless tiger beetle Amblychila baroni.

August 5, 1982 - Central and Eastern Utah - Drive all afternoon to get from Parowan, UT, to Green River, UT (250 miles) to look for unique suspecies Cicindela repanda tanneri before the sun goes down. Successful in arriving before sundown, but it makes no difference because the water is so high that all the beetle habitat is flooded.

August 7, 1982 - Ceresco, Lancaster Co., Nebraska - Accidentally discover a marijuana patch growing among the weeds in a state game area.

November 14, 1982 - Rosewood, Levy Co., Florida -Questioned by two Conservation Officers about collecting activity on state park land; however, identification and collecting permit prevent further questioning.

LOCUSTS AND THEIR CONTROL

S. Turner
England

Locusts are the most widespread and ancient of the world's agricultural pests. In their swarms, which number millions of individuals, they can cause enormous damage to crops. To those people who survive by subsistence farming, a plague can spell disaster. In 1968, a swarm was analyzed from an aircraft over the Somali Republic. The swarm covered an area of 1000 sq. km. consisting of approximately 40,000 million individuals.

To maintain flight a lot of energy is needed—with each locust consuming its own mass equivalent in food each day. Thus a swarm of the size mentioned above requires 80 million kg. (80,000 tons) of food per day. This amount of corn would feed 500,000 people for one year. Consequently, it is important to be able to predict when a swarm is likely and also, if possible, where the breeding grounds are. This knowledge, combined with suitable methods of control, could solve the problem of massive swarms and consequent crop damage.

The Phase Theory

The origins of the location of a swarm are still something of a mystery and, as swarms do not occur regularly pinpointing the exact place where they start, is almost impossible. There are two forms of locust, one that lives as a solitary grasshopper and another that has a strong tendency to unite as a migratory swarm. When the solitary type is kept in crowded conditions for one or two generations, their shape and color change and they become identical to the gregarious migratory type. So, when in the solitary state they do relatively little damage until local overcrowding provides the conditions for the formation of migratory swarms.

Migration

The distances covered during a migratory flight range from 1500 to 5000 km., and they may remain airborne for perhaps 17 hours, although by alternating active flight periods with gliding on the prevailing winds, a swarm may stay aloft for longer. Locusts are poikilothermic, so external air temperature affects their rate of metabolism; during cold periods, flight activity is reduced. When the temperature is somewhere between 15 and 24^0C, the locusts are willing to embark on a migration flight. Thus temperature is important to predict swarm movements. When confronted with cooler weather during a flight, the locusts will settle, possibly remaining in one locality for a number of days. During these rest periods they cause most of their damage.

Locust Control

The need to control locusts is just as great as it has ever been. Every female locust in a swarm can lay three egg pods: approximately 200 eggs. If there were no deaths by natural causes or no form of control, the entire surface of the world would be covered with locusts in four or five generations. Fortunately, however, this could not happen because there is a relatively high mortality rate from natural causes. The rigors of migration greatly reduce their numbers. As the movement of a swarm is governed by wind direction, it may be carried to a site unsuitable for breeding. Storms, drought, and predators also take a large toll. In one recorded case, 99.6% of the locusts were lost during a migration. The remaining 0.4%, however, was still a large number population.

Once a suitable breeding site has been found, the female must deposit her eggs as soon as possible, since they are only capable of being retained for three or four days before they have to be discarded. During the period between laying and hatching, moisture is essential; any deviation from the necessary amount and the eggs will be unable to develop further. Alternatively, heavy rainfall may cause flooding and wash away the soil around the eggs. Even dry and dusty soil can be blown away by the wind, leaving the eggs exposed to the direct heat of the sun. Rapid drying in this way will halt any further growth of the eggs. Having perhaps survived these dangers, the young hopper is still faced with hazardous situations. They require food almost as soon as they hatch, and if inadequate rainfall results in a sparse layer of vegetation, many will starve while still young.

In common with other animals, locusts are subject to predation and other disease-carrying organisms. Stomorhina, a fly similar to the housefly, lays its eggs on the loose soil covering the egg pods. The larvae that hatch burrow into the egg pods and consume their contents; generally, 20% of the eggs are lost this way. Flocks of European storks frequently follow hopper bands and eat many of them. Also, fungal diseases and internal parasites can kill them, mainly because of the ease with which they can be transmitted among a large band of locusts.

Control by Humans

Despite the deaths caused by the natural controls, locusts still reproduce in quantities sufficient to constitute their status as a serious pest of agriculture. Until the use of insecticides, farmers who lived in the infested areas concentrated on driving the locusts away. Among the methods adopted was beating tins and drums accompanied by enormous bonfires lit across the path of the advancing hordes. Often the egg fields were ploughed over, bringing to the surface the egg pods which were then collected and burned. Trenching was another, quite effective, method. Large trenches were dug into which the hoppers were driven and either burned or buried. Chemical pesticides made it much easier to destroy hoppers at their breeding site. Of these, sodium arsenate was the first to be used on a large scale. Mixed with a suitably attractive bait, it was laid across the path of the advancing hoppers and effectively killed many. Specific insecticides were then used, the commonest was the gamma isomer of benzene hexachloride, Y BHC (1,2,3,4,5,6 hexachlorocyclohexane). Insecticides currently are the most feasible method of control. To facilitate its dispersal there is a device which fits onto the exhaust outlet of vehicles and is operated by the pressure of the exhaust gases. This saves much in the way of time and labor where manual application is costly. The advantage of this system is that the insecticide is reduced to very fine droplets which are widely dispersed. Also commonly used are aircraft. With airplane, swarms can be spotted quickly and treated with an insecticide, usually a contact poison. A modern insecticide, Diazinon, killed 180 million locusts from a single aircraft loaded with only 360 litres of Diazinon.

Biological Control

For some insect pests, the introduction of natural enemies or disease-carrying organisms has proved an effective method of control. However this, and, at the moment, most methods of biological control with regard to locusts, has little effect because of the sheer size of the locust populations. Theoretically, it should be possible to introduce parasites into a locust population. But the mobility of locusts and their vast numbers do not allow the parasites to build up to a sufficient level to be effective. Even fungi and protozoa that can kill locusts within two days are ineffective in unfavorable weather conditions.

At one time, the laboratory sterilization of male locusts seemed a promising development, using chemical sterilants and replacing the treated males in a normal population. But this is neither practical nor economical. To be effective, billions of male locusts would need to be sterilized, and the dose of sterilant needed for the required effect killed the locusts.

Another method involves interfering with the locust's pheromones. Locusts produce a number of pheromones that govern reproductive behavior. The maturation pheromone synchronizes the maturation of the male and female locusts. By applying some simple chemical compounds, locust growth can be disrupted, causing far fewer fertile eggs to be produced. Even more promising is the discovery of the pheromone that governs the change from the solitary to the gregarious phase. If a blocking agent for this pheromone could be discovered or synthesized, it would inhibit the formation of migratory swarms and leave locusts permanently in the relatively harmless solitary state. The most desirable control though, is one that is achieved by genetic manipulation. It may be possible to produce mutants that when introduced into a normal population would genetically pass on hormonal or behavioral changes. This could be the ultimate method of control, since the effects would be self-perpetuating and would not require repeated applications.

References

Clarke and Richards, 1976. The Locust as a Typical Insect.
Freidlander, C. P. 1978. Biology of Insects.
Imms, A. D. Insect Natural History.
Oldroyd, H. 1966. Insects and Their World.
Wigglesworth, V. B. 1972. The Life of Insects.

PREPARING FOR TROPICAL INSECT COLLECTING

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Entomologists, both amateurs and professionals, who live where it is cold and snows for several months of the year, find insect collecting in the tropics truly rewarding. The diversity of species is usually much greater, as are insect shapes, sizes, and colors. However, new collecting problems are encountered in the tropics that have never been considered before by those in temperate regions.

The first problem one encounters in preparing for such a trip is packing all the necessary collecting equipment. Plan out beforehand what kind of collecting you are going to do and what group of insects you are concentrating on. Pack as much equipment as possible without overburdening yourself. Supplies such as traps, kill jars, nets, jars, etc. should be brought to, and not purchased at, the final destination. In an unfamiliar city, it is too time-consuming to find stores that might have the necessary items, especially if one has difficulty communicating with people in their native language. In fact, even some of the simplest materials easily obtainable in the U.S. (like markers, paper envelopes, alcohol, nets, and pins) are practically impossible to find in the smaller cities of Central and South America. Also, don't forget some personal items such as salt tablets, a first aid kit, necessary immunizations (hepetitus, tetanus, and anti-malaria pills), insect repellent, sun screen lotion, water purification tablets, and a canteen. The sun and some insects will be hunting you as much as you are hunting them.

Commonly, an entomologist's most crucial tool, the insect net, also presents a packing problem. Most nets with their long handle are too bulky to pack in a suitcase. In my experience, an insect net with a removable wire hoop and telescoping handle is the best. Each part can be packed separately in a suitcase and assembled later. Also, you can purchase an inexpensive handle from a hardware store under the name of paint roller extensions. These three-or-four threaded rods screw into one another for any desired length. The handle can be adapted easily to fit an insect net hoop with a few screws and ingenuity.

Once all the equipment is assembled, I recommend packing some of it in a small gym bag, apart from the other luggage. On the return flight, the bag can be used to store your valuable insect specimens. To many, the insects that are brought back are more prized than anything else; therefore, care must be taken to protect the insects.

Once in the jungle, another problem soon becomes evident--humidity. Tropical and subtropical regions of the world are very warm and humid, especially during the annual rainy season. Dead insects exposed to such an environment either become greasy, discoloring them, or moldy. Thus, all possible precautions must be taken to protect the insects from the high humidity. First and foremost, all insects caught and killed should be immediately placed in small paper envelopes, on which the collection data can be written. Some people also put in a small piece of tissue, which does help to further protect the insects and absorbs insect oils and moisture, but the fragile, brittle insect legs become entangled in it. For that reason, I do not recommend its use. Do not put too many insects in each envelope. Envelopes protect the insects from handling damage and isolate specimens so that if mold does begin to grow, it will be confined to a few specimens. I find glassiline envelopes, sold in camera stores for storing prints, to be the best. They are already folded and come in a wide variety of sizes.

Other essential items for humidity protection are anti-mold chemicals, a water absorbant, and storage containers. Chlorocresol is the most popular mold growth inhibitor. It should not be placed inside the envelopes of insects for it can crystallize on the specimens. Silica gel is the best dessicant to use. I recommend that a few crystals be put into each envelope. Both compounds should be placed in the bottom of a storage container in the envelopes. Snap-top plastic food storage containers are the best. They can be purchased anywhere in many different sizes and are unbreakable and air-tight.

Even after all these precautions are taken to prevent humidity damage, the insects may still be ruined from their own body moisture if one crowds too many specimens into the envelopes. Unfortunately, this sometimes is necessary when a tremendous amount of insects are collected and space to store them in the flight luggage is limited. The only alternative then is to dry out the insects before sealing them in the envelopes. A couple of hours in an oven would be ideal but, of course, such luxuries are rare in the jungle. The next best thing is sun drying. Laying the dead insects out on the ground to dry for a day or two is helpful, but very often ants will steal away your prize catch. Alternatively, an automobile or other glass-enclosed structure can be used as an artificial oven. The sun's heat buildup is rapid and in half a day will dry out insects that are kept inside.

Although brief, I hope that the information provided will aid those who are fortunate enough to partake in tropical insect collecting. The experience is worth the effort, and the sooner the better, while there are still jungles and species left.

NESTING HABITS OF POLISTES

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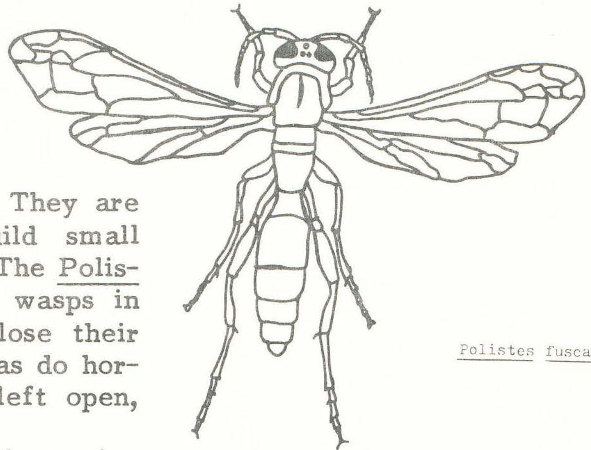
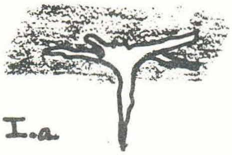
The genus *Polistes* (Family: *Vespidae*) commonly known as paper wasps, are widely distributed throughout the United States and Southern Canada. They are social wasps that build small hanging paper nests. The *Polistes* differ from other wasps in that they do not enclose their nests in paper sheaths as do hornets. The cells are left open, facing downward.



Polistes fuscatus

Nesting begins in the spring when queens emerge to seek suitable locations to establish future colonies. Nests (usually 20-23 cm.) are suspended from shrubs, tree branches, or eaves of buildings. The queen begins the single comb structure by placing a dab of paper pulp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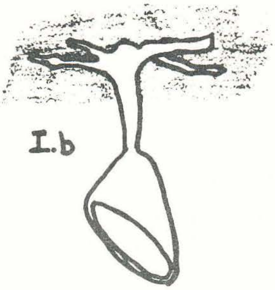
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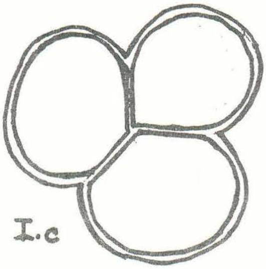
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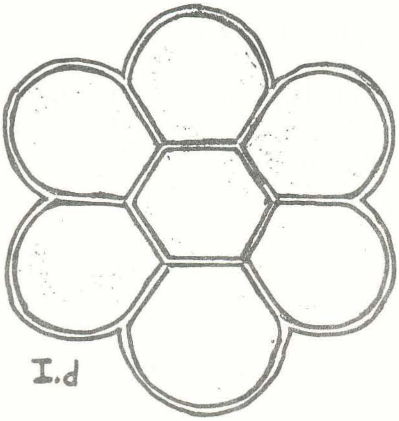
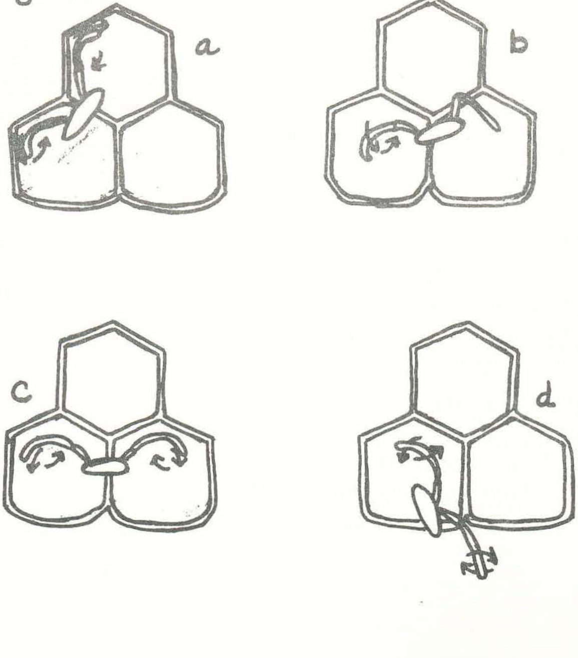

I.d

beneath the chosen surface. Gradually more pulp is added and extended to form the stem-like pedicel, approximately one centimeter long (Fig. I.a). The end of this is formed into the first cell (Fig. I.b). The queen deposits a single egg in each new cell she adds.

The new cell is round at first (Fig. I.c), but as more cells are attached beside it, it is squeezed into a hexagonal shape (Fig. I.d). This

Figure II



occurs because Polistes build in series of horizontal rows, using their antennae and completed cells as guides. They can then determine correct wall length for the new cell by patting their antennae along the guide cell's walls and building equidistant walls between those existing cell walls (Fig. II). The use their mandibles to adjust the cell mouth to its proper width.

The Polistes use dry weed, wooden boards, grass, and other vegetable fiber to make their paper. An individual will, for example grab the end of a wood fiber with its mandibles and step backwards to tear it off. Then it rolls the fiber up under its thorax and returns to the nest. The fibers are soaked with fluid regurgitated from the crop, and then added as paper pulp.

Two weeks after the first eggs are laid, larvae emerge and develop into workers. These workers take over the task of nest building and colony maintenance from the queen. Unlike the bee family which uses part of the comb for storage, Polistes use the nest cells solely for rearing larvae.

The larvae are fed a paste of chewed insects. A worker bringing food summons the larva by tapping its head at the cell entrance. The larva responds by poking its head out and taking the food. Although the larvae exist in an upside-down position, they "defy" gravity by pressing their bodies against the sides of their cells. Two weeks after hatching, they begin pupation. The cell entrance is then sealed by the larva with a fine layer of cocoon silk. Most of the adults that emerge later are female workers. For this reason, Polistes colonies are sometimes referred to as polygynous communities. Fewer than one hundred adults inhabit a typical nest.

Since the Polistes nest is not encased by a paper envelope, it contains no trapped air to control internal temperature. Polistes species in tropical regions fan their wings over the nest or collect water in their jaws and deposit it over the comb to cool it.

The nest of Polistes living in the temperate zone is a constantly varying structure, indicating seasonal changes. In the early spring when the nest is new, there are few cells. As summer arrives, the original cells in the center are occupied by larvae. Simultaneously, more cells are added around this central area. Activity gradually increases in the new outer cells as it decreases in the old central ones. Egg laying and cell construction ceases in the late summer, causing a decline in the colony. The last brood often dies as autumn brings food shortages. Eventually the workers abandon the nest and all but the queen die when cold weather sets in.

References

Evans, H. E. and M. J. W. Eberhard. 1970. The Wasps. Ann Arbor: University of Michigan Press.

Spoczynska, J. O. I. 1975. World of the Wasp. New York: Crane, Russak & Co., Inc.,

"Wasps." 1974. Encyclopedia of Animal Life, Part 92.

THE ORANGE GROVE

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When I got to the orange grove, it was about 12:30 p.m. and overcast, so there were no shadows. There had been a slight wind and the news said there was a 50% chance of rain. The temperature was in the mid-70s. The orange and grapefruit trees were loaded with fruit and a lot was on the ground rotting, so the smell of fruit filled the air. I walked down the rows of trees until I came to some bushes of lantana in bloom, with its pink and yellow flowers. The bushes grow right next to the fruit trees and are a nuisance to the growers.

As I moved along the rows, I spotted a fence lizard (Sceloporus undulatus). These are common in the groves. I then moved along to the Lantana and saw a small black swallowtail (Papilio polixenes) eating nectar, so I caught it. I saw a very yellow cloudless sulfur (Phoebis sennae) fly by, very high, stopping only at the grapefruit high in the trees. Even though I saw these many times during the day, they flew too fast for me to catch them. Still later, I saw a pipevine swallowtail (Battus philenor). A low, fast flier, it flew to the Lantana blossoms, then flew away. Two giant swallowtails (Papilio cresphontes) came along, then were joined by a third. Together, they went to feed at the Lantana, then flew into the air and were joined by the pipevine.

Later, at another Lantana bush, I saw my first painted lady (Vanessa virginiensis); these become very common as the season progresses. A red admiral (Vannessa atalanta) also came to the Lantana, as did several fiery skippers (Hylephila phyleus), a male tiger swallowtail (Papilio glaucus), and two Horace's skippers (Euynnis horatius). Other insects sharing the flowers were small bumblebees and yellow jackets. I liked being there.

Two days later I went back to the same orange grove. (There are some grapefruit trees in it.) This time it was sunny and bright, and I went straight to the Lantana bushes--they are the best bait for butterflies. The butterflies I saw at the blossoms were an orange-barred sulphur (Phoebus philea), and two cloudless sulphurs, one yellow and one green. These stayed only a brief time, then flew away. Several more giant swallowtails came; these are swift fliers and can only be easily caught when feeding on the Lantana. Another pipevine and a spicebush swallowtail (Papilio troilus) came to the Lantana. I then went along the rows again and saw a zebra (Heliconius charitonius) in the shadows. These are common, flying low among the branches. Also in the shadows and among tall grasses was the Carolina satyr (Eutypchia hermes).

A LEPIDOPTERIST

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I am now almost twelve years old. Since I was three, I have been collecting and have been extremely interested in butterflies and moths. For the past four years, I have been making butterfly frames and studying them. My favorite butterfly is the monarch, for I have been raising them from eggs for three years. I have hatched some sixty or seventy in this period of time. In my studies, I have written reports and have captured the full life cycle of a monarch on film.

Butterflies can be found on flowers, resting on roads, and fences, and some butterflies may be found in damp places or at the edge of puddles. One of the best places to find them is in fields.

One excellent spot that I know of for collecting butterflies is the Adirondacks. There is a great quantity of assorted swallowtails, white and red admirals, and many other butterflies and moths in the Adirondacks. At night, you may want to try to catch a luna moth. These beautiful green moths are attracted to lights.

Since butterflies are delicate insects and moths even more so, care must be taken when collecting them. Have a net with an opening at least a foot wide. Several different strokes of the net may be used. One stroke that I find very effective is the side stroke. This stroke may be used on fast butterflies that rest on the ground, such as red admirals or painted ladies. A second stroke is simply bringing the net down over the butterfly. This is effective on slower butterflies that rest on flowers, such as the swallowtails.

In killing these insects, gently take them out of the net holding them with the two wings together. Dispatching fluid can be bought in stores and kills butterflies almost instantly.

I have just recently started to observe the fritillary because of an experience I had with one. One day I was at my grandmother's house when a fritillary appeared and landed on her porch. I decided to try to catch it with my hands. I went to reach for it and it flew away and came back. This time I approached it differently. I put my finger slowly under it, lifted it slowly up, and it surprisingly let me stroke its thorax. After about five minutes, it flew off my hand and back onto the porch. It didn't leave until hours later. This happened to me three other times, with three other butterflies.

At my house in New Fairfield, Connecticut, I have many types of butterflies and moths, from atlas moths (giant silkworm moths) to luna moths to different types of swallowtails. I hope to be an entomologist in the field of butterflies and beetles when I grow up.

I really like "TIEG MAGAZINE" and am extremely interested in the articles I read out of "TIEG!"

THE CARABUS OF ITALY

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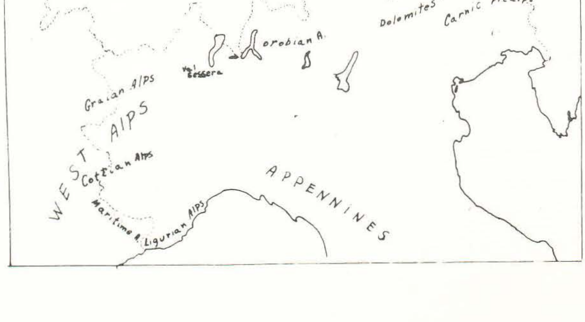
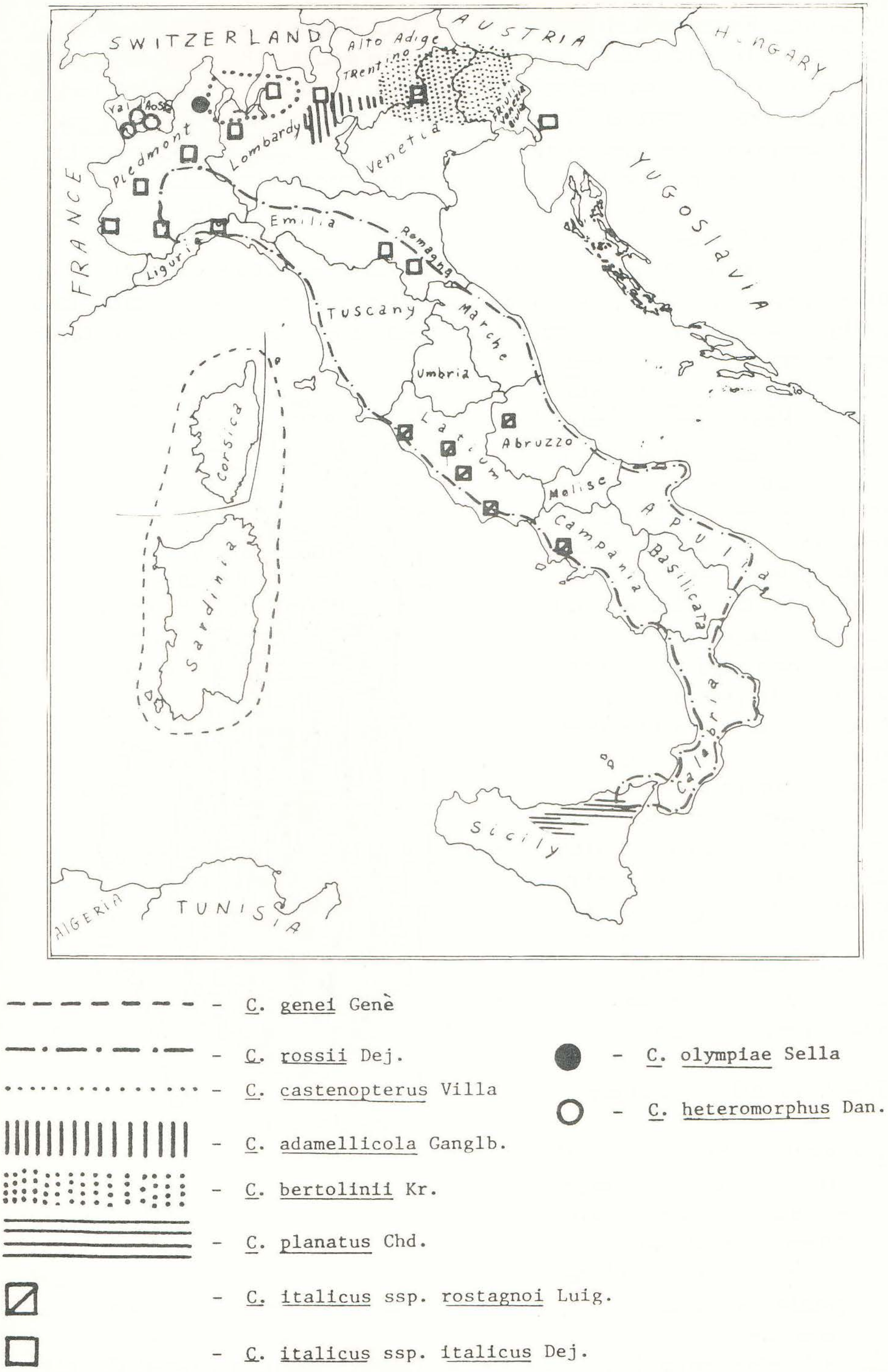
The genus Carabus is represented by 550 species known today. The distribution of Carabus species is entirely holarctic, with 500 species present in the palearctic region. In North America, there are only 10 species and some of them have been introduced from Europe (C. nemoralis, C. granulatus, etc.) In Italy there are 48 species of Carabus, nine of which are endemic.




SWITZERLAND
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Emilia
Romagna
Liguria
Tuscany
Marche
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Lazium
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Molise
Corsica
Sardinia
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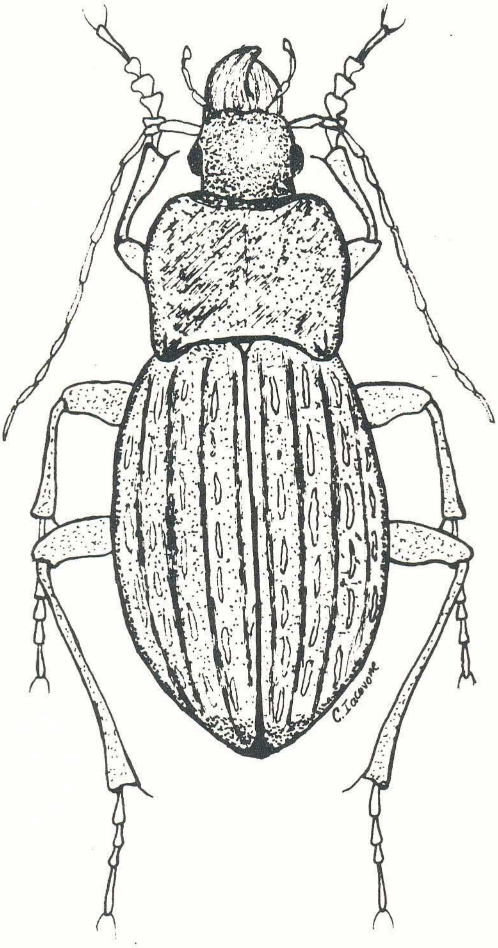
TUNISIA
- - - - - - - - - C. genei Genè
—·—·—·— - C. rossii Dej.
··············· - C. castenopterus Villa
||||||||||||| - C. adamellicola Ganglb.
⁞⁞⁞⁞⁞⁞⁞⁞⁞ - C. bertolinii Kr.
☰ - C. planatus Chd.
▨ - C. italicus ssp. rostagnoi Luig.
□ - C. italicus ssp. italicus Dej.
● - C. olympiae Sella
○ - C. heteromorphus Dan.

Italy is a peninsula of 80% mountainous territory, with the Alps and Prealps (Lombardy, Venetia, Carnic, and Julian Alps) in the north and the Appennines in the south, that extend along the peninsula. This mountainous area is partially volcanic with four active volcanos (Vesuvio, Etna, Stromboli, and Vulcano). This mountainous aspect is an ideal habitat for *Carabus* species, especially in the north, where there are more species.

Biological Notes

These ground beetles live in moist areas, like forests, near streams, etc. Many species live at high altitudes (more than 2000 meters high). Some of them are specialized in their environments, like *Carabus* (*Hygrocarabus*) *nodulosus* that lives near streams and is able to plunge into water, where it preys on all kinds of insects. In fact, these Coleoptera are predaceous (both adults and larvae), like almost all Carabidae and are beneficial. In general, these beetles are terrestrial, with only a few species being able to fly.



Carabus cancellatus Ill.

Carabus are noctural and sometimes (rainy days) can be seen in daylight. During the day they can be found under rocks, logs, bark, etc., any place where there is sufficient humidity.

The CARABUS of Italy

Carabus (*Archicarabus*) *alysidotus* Illiger: south France, Italy: Maritime Alps, Tuscany, Latium, Campania, Abruzzo, Marche.

C. (*A.*) *monticola* Dej.: west Alps, Italy: Maritime Alps, Cottian Alps.

C. (*A.*) *nemoralis* O.F. Muller: north and middle Europe, Italy: Val d'Aosta, Veneto, introduced in North America.

C. (*A.*) *rossii* Dej.: endemic species of Italy (Fig. 1), absent in sardinia.

Carabus cancellatus Illiger: Europe into Siberia, Mongolia, Italy: Alps, Prealps, Appennines (Tuscany-Emilia), introduced in North America.

C. *clatheratus* Linne: Europe, Asia (Caucasus, Armenia, Iran, Siberia, into Korea and Japan), Italy: Piedmont, Lombardy, Venetia, Tuscany, Latium.

C. *granulatus* Linne: Europe, Siberia, China into Japan, Italy: all Italy, introduced in North America.

C. *vagans* Oliver: Basses Alps, Maritime Alps, Italy: west Liguria.

Carabus (*Chaetocarabus*) *intricatus* L.: north and middle Europe and south into Bulgaria, Italy: Liguria, Piedmont, Val d'Aosta, Lombardy.

C. (*C.*) *lefebvrei* Dej.: Greece, Albania, Italy: endemic ssp. *bayardi*-Tuscany, Latium, Abruzzo, Molise, Campania, Apulia, Basilicata, Calabria and ssp. *lefebvrei*--limited to south Calabria and north Sicily.

Carabus (*Chrysocarabus*) *auronitens* F.: north and middle Europe, Italy: limited to Val d'Aosta and Trentino Alto Adige.

C. (*C.*) *solieri* Dej.: southeast France, Italy: Piedmont and Liguria.

Carabus (*Eurycarabus*) *famini* Dej.: Morocco, Algeria, Tunisia, Italy: west Sicily.

Carabus (*Eurycarabus*) *genei* Gene: endemic species of Italy living only in Sardinia and Corsica.

C. (*Habrocarabus*) *problematicus* Herbst: north and middle Europe, Italy: Alps and north Appennines.

C. (*Hygrocarabus*) *nodulosus* Creutzer: middle and eastern Europe, Italy: limited to east of Friuli Venezia Giulia.

C. (*Macrothorax*) *morbillosus* F.: south of Spain, Tunisia, Algeria, Corsica, Italy: Sardinia and Sicily.

C. (*M.*) *planatus* Chd.: endemic species living only in Sicily.

C. (*Megodontus*) *germari* Sturm: north Alps to Hungary, Italy: Piedmont, Lombardy, Liguria, Emilia Romagna, Venetia, Trentino Alto Adige, Friuli Venezia Giulia.

C. (*M.*) *violoaceus* Linne: north south and east Europe, Italy: all Italy, excluding Sardiniam Sicily, and continental Italy (ssp. *pineus*).

C. (*Morphocarabus*) *arvensis* Herbst: north and middle Europe, Italy: Venetia.

C. (*M.*) *catenulatus* Scopoli: southeast of Europe, Italy: Alps and Prealps.

C. (*M.*) *italicus* Dej.: endemic species probably living in all of Italy, excluding Sardinia and Sicily.

C. (*Oreocarabus*) *glabratus* Payk.: north and middle Europe, Italy: northern Italy.

C. (*0.*) *hortensis* Linne: north and middle Europe into Greece, Italy: central and eastern Alps and Prealps.

C. (*O.*) *preslii* Dej.: Albania, Greece, Italy: limited to Calabria, Campania and Basilicata.

C. (*Orinocarbus*) *adamellicol* Ganglb.: endemic species limited to the Dolomitic Alps.

C. (*O.*) *bertolinii* Kr.: endemic species limited to the eastern Alps and Prealps.

C. (*O.*) *carinthiacus* Sturm: north Balkans and eastern Alps, Italy: Alto Adige and Venetia (north).

C. (*O.*) *cenisius* Kraatz: Cottian Alps and Graian Alps, both on French and Italian versant.

C. (*O.*) *castenopterus* Villa: endemic species limited to north of Piedmont and Lombardy.

C. (*O.*) *concolor* F.: western Alps, Italy: Val d'Aosta.

C. (*O.*) *fairmairei* Thoms.: Cottian Alps (FRance and Italy).

C. (*O.*) *heteromorphus* Dan.: endemic species living only in the Graian Alps.

C. (*O.*) *latreilleanus* Csiki: endemic species living only in the Swiss versants.

C. (*O.*) *linnei* Panz.: middle and east Europe into U.S.S.R., Italy: Carnic Alps, Dolomites.

C. (*O.*) *putzeysianus* Geh.: Cottian Alps, Maritime Alps, Ligurian Alps, also in French versant.

C. (*O.*) *silvestris* Panz.: middle and east Europe, Italy: near border with Switzerland and Austria.

C. (*Pachystus*) *cavernosus* Friv.: Albania, Yugoslavia, Bulgaria, and Italy. Italy: represented by ssp. variolatus, limited to Abrusso.

C. (*Procerus*) *gigal* Creutz: Greece, Bulgaria, Rumania, Austria. Italy: Ventia, Friuli Venezia Giulia.

C. (*Platycarabus*) *fabrici* Panz.: middle and east Europe. Italy: Alto Adige.

C. (*P.*) *creutzeri* F.: central Alps and Prealps. Italy: North of Lombardy, Alto Adige, and Friuli Venezia Giulia.

C. (*P.*) *cychroides* Baudi: Endemic species living only in Cottian Alps (France and Italy).

C. (*P.*) *depressus* Bonelli: All Alps (France, Switzerland and Austria). Italy: Piedmont, Val d'Aosta, Lombardy, Alto Adige, Friuli Venezia Giulia, Venetia.

C. (*P.*) *irregularis* F.: middle and east Europe: Belgium, France, Austria into Yugoslavia. Italy: Val d'Aosta.

C. (*Procrustes*) *coriaceus* L.: All Europe, excluding Portugal, Spain and British Isles. Italy: all Italy excluding Sicily and Sardinia.

C. (Sellaecarabus) olympaie Sella: Endemic species, living only in Val Sessera. Because of its beauty it has been over-collected by entomologists and was thought to be extinct. However, it has been rediscovered.

C. (Tomocarabus) convexus F.: All Europe, excluding Iberian Peninsula and British Isles. Italy: there are two sub-species --convexus F. (all of Italy excluding Sardinia and Corsica) and dilatatus Dejean (East Alps).

References

Casale, A., Sturani, M., Vigna, T.A. 1982. Carabidae I. Fauna d'Italia. Vol. 18: p. 499, Calderini.

Bruno, S. 1974. Catalogo ragionato dei Carabini del Lazio (Italia centrale) (Coleoptera: Carabidae, Carabinae). Boll. Ass. Rom. Ent. Vol. 28 (1973): pp. 1-30.

Porta, A. 1923. Fauna Coleopterorum Italica. Vol. 1: Adephaga:p. 238, Piacenza.

BASIC INSECT COLLECTING

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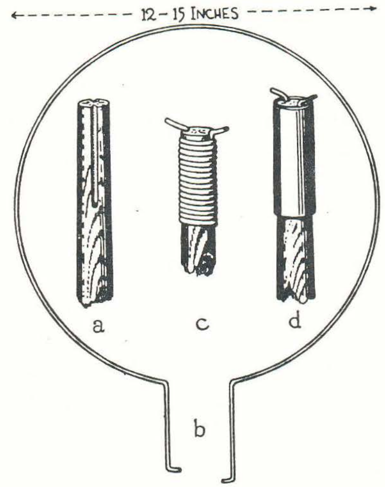
A sure sign of summer for many kids is the presence of insects on the wing. This is when children see adult butterflies and bees visiting flowers for nectar, moths flying around lights in the patio, and fireflies glowing in the night. For those budding entomologists who might like to start collecting and preserving insects, here are a few suggestions:

Where To Collect

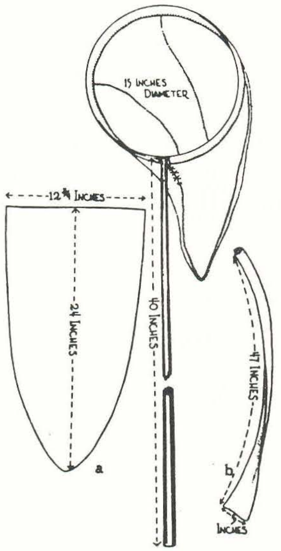
During the summer, insects are very abundant in fields and woods, and large numbers of them may be caught by sweeping through the grass with an insect net. Flowers are also favorite visiting places of bees, flies, beetles, and other insects.

What To Use

A fairly large insect collection can be made with a small amount of equipment. A good insect net is the most important item in the collecting kit of an entomologist and can be easily made at home. The necessary parts are a handle, a loop or ring



Net loop and handle. The short grooves cut opposite each other at the small end of the handle (a) end in holes through the handle that receive the hooks of the loop arms (b). The loop may be permanently bound to the handle with wire (c), or a removable metal ring which slips up and down can be used (d) (from Ross 1966).



Bag and completed net. The bag is cut from four pieces shaped as in a, and the top edge of the bag is bound with a narrow strip of stout muslin or light canvas, b, by means of which the back vent may be closed with a string lacing, as shown in the figure. This closing, which keeps the back of the net from gaping, prevents the escape of the most active insects through the back opening. The handle pictured here is a removable type, fig. 2d. (Taken from Ross 1966).

to be attached to it, and a cloth mesh bag to be hung from the loop.

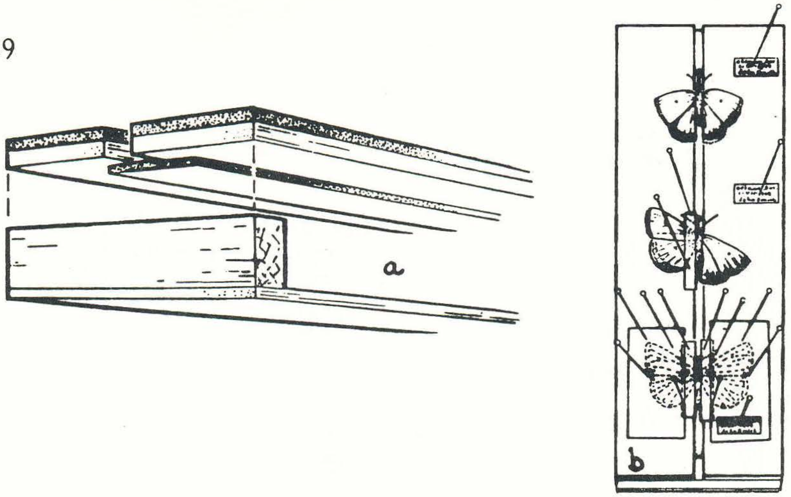
Killing Bottles

A peanut butter jar (or other similar sized jar) is adequate to kill insects once they have been caught. On the bottom of the jar place about one inch of sawdust and over it pour one inch of a newly mixed, thick "batter" of Plaster of Paris and water. Allow the plaster to harden over night. To use the jar, pour in a small amount of killing agent (ethyl acetate, ether, or carbon tetrachloride) in the bottom of the jar--enough to saturate the sawdust. ALL POISONS used in killing jars are

potentially dangerous and should not be inhaled. Once the poison is in the jar, keep the lid on tight, except when in use. (Editor's note: many insects can be killed by freezing or immersion in alcohol.)

Relaxing Jars

Soon after insects are killed, they dry out, become very brittle, and can be damaged very easily. Butterflies, moths, and true flies are particularly susceptible to breakage and should be relaxed for a short time in a relaxing jar if they are not pinned soon after being caught. A relaxing jar is constructed by placing an inch or two of sand in the bottom of a wide-mouth jar with a screw-on lid. Saturate the sand with water containing a small amount of phenol or ethyl acetate (a moth ball will work) to prevent the formation of mold. Place a circular piece of cardboard approximately the diameter of the jar over the sand and cover the jar tightly. Dry specimens placed on the cardboard for 1 to 2 days will be soft and pliable enough for pinning and spreading, the next steps toward permanent arrangement of the collection.



Design and construction of a spreading board (a); showing proper spreading technique (b) (from Martin 1978).

Pinning And Spreading

Hard-bodied insects, such as beetles, flies, and wasps are preserved as dry specimens on pins rather than in liquid. The pinned specimens are more convenient to study and generally retain their natural color. Common household pins are too thick and short for pinning insects. Longer, slender pins called insect pins (usually sizes #2 and #3) are necessary and may be purchased from a biological supply house. In most insect groups, specimens should be pinned at the right of the center line of the thorax, near the base of the wing.

Moths and butterflies should have their wings spread before being put into the collection. To do this, it is better to have spreading boards which are neither complicated nor expensive to construct. They usually consist of two flat, parallel pieces of softwood with a cork-lined groove between their inner edges.

Once the insects are pinned or spread, you can put the collection in an empty cigar box with a cork bottom.

SITUATION UPDATE . . .

Well, now that you have read through the first issue of Y.E.S. QUARTERLY, what do you think? I hope you agree with me that we're off to a great start!

I thank all of you for sending in the questionnaire sent out in January. Your comments have helped us formulate our plans and chart a new course. Although I cannot respond individually to your many comments, ideas, suggestions and questions, I will try to bring you up to date through this "situation update." Hopefully, you all understood that the mailing you received was only a PROPOSAL to get you thinking. It was not set in concrete, and as you can see from this premiere issue of Y.E.S. QUARTERLY and from the following comments, we have incorporated your ideas into our reorganization plan. We have tried to transform TIEG into an organization that meets all of its members needs. And, I have to be honest: we also tried to incorporate a few ideas that will make the operation run more smoothly here at Michigan State University, and this will insure that we do not fail in our mission.

Let me share with you some of the important results of our questionnaire: 115 members (out of 350) responded to our request for information. Of the respondents, 1% were under 10 years of age; 18% were 11 to 18; 18% were 19 to 25; and 63% were over 26. Most are amateurs (54%), 18% are casual entomologists (hobbyists), 18% professionals and 10% others. Most members are interested in Lepidoptera (32%), Coleoptera (19%), techniques (14%) and general interests (9%), while the remaining 26% were interested in applied entomology, insect ecology, 4-H and youth entomology and the other insect orders. Regarding length of membership, respondents were from all categories from less than one year to 20 or more. Many respondents were in the 1, 2, 6, 9, 10, and 15-year categories. Most members joined TIEG to receive the publications, but also to correspond and trade. Only a few people expressed a desire to share their information and knowledge with others through the publications. Most members have done some corresponding, but it was often difficult because of old addresses, lack of mailing lists, failures to respond, and lack of time. Just about everyone agrees that the membership list is one of the most important aspects of the organization, and we will obviously need to find a way to make this operation work better. (Anybody have any ideas?)

The rest of the questions centered around the reorganization. I stress reorganization rather than disbanding, because as many of you noted, TIEG had many desirable qualities. I assure you that we fully intend to retain these qualities, especially for the "young" (not teen—look at how many adult members we have!) entomologists with interests ranging from casual to professional. However, TIEG has "grown up" and we need to be a little more flexible. The change in name (a symbol of our reorganization and rebirth) will allow us to put our past problems where they belong (in the past) and to start fresh. The responding members, by a margin of 110 to 4, agree.

This first issue of Y.E.S. QUARTERLY is our first step in our metamorphosis. More is on the way. Our second issue is ready to be word-processed and should be mailed on schedule in April. We will be designing a brochure and preparing new releases to make ourselves known. And, in the near future you will receive information and instructions on dues, membership "transfers" and directory listings. Meanwhile, send us your comments, support, and articles!

GARY A. DUNN
Y.E.S. Advisor